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SALEM, MASS.

OF THE

ROYAL ASIATIC SOCIETY.

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ART. I.—*Description of the various Classes of Vessels constructed and employed by the Natives of the Coasts of Coromandel, Malabar, and the Island of Ceylon, for their Coasting Navigation.* By JOHN EDYE, Esq., late Master Shipwright of His Majesty's Naval Yard at Trincomali, now in the Department of the Surveyor of the Navy.—Communicated by the late Major-General Sir JOHN MALCOLM, G.C.B. K.L.S. M.R.A.S. &c. &c.

Read 1st of June, 1833.

THE following Paper having been referred by the COUNCIL of the ROYAL ASIATIC SOCIETY to Sir JOHN MALCOLM, for his opinion as to its eligibility for insertion in the Printed *Transactions* of the Society, was returned by that distinguished and lamented individual, with a Letter of which a copy is subjoined, and which will be found to point out, in a very satisfactory manner, the practical value of Mr. EDYE's communication.

"To the Secretary of the ROYAL ASIATIC SOCIETY.

SIR,

"Before I comply with the desire of the COUNCIL to report on Mr. EDYE's Treatise on Indian Vessels, it may be useful to explain how it came into my possession.

"When on a visit to Chatham, Mr. EDYE, who is now employed in His Majesty's dock-yard at that place, shewed me this manuscript; and deeming it very curious, I begged he would allow me to present it to the ROYAL ASIATIC SOCIETY, which might, I thought, consider it worthy of a place in its *Transactions*; not only as it exhibited the actual state of the art of Ship-building in India, but on account of the evidence it contained of that art being at the same stage at which it now is, at a period of the most remote antiquity. Mr. EDYE's manuscript appeared to me to possess more value from the remarkable fact, that many of the

vessels of which he gives us an account, illustrated by correct drawings of their construction, are so admirably adapted to the purposes for which they are required, that, notwithstanding their superior science, Europeans have been unable, during an intercourse with India of two centuries, to suggest, or at least to bring into successful practice, one improvement. I may adduce the *Masula* boats, on the Coast of Coromandel, in proof of this assertion; and, to my knowledge, both talent and skill have laboured in vain to improve the shape and construction of those vessels.

“The COUNCIL having referred this paper to me, I shall shortly state its contents, and my opinion of its value.

“Mr. EDYE, by a residence of five years in India as His Majesty’s Master-shipwright in Ceylon, had singular opportunities of becoming perfectly informed on the subject of which he treats in this Memoir. He describes in a clear and concise manner the various vessels of the coasts of Coromandel, Malabar, and Ceylon; which he classifies as follows:—

Catamarans of Ceylon, the Malabar and Coromandel coasts, &c.

Canoes of Point De Galle and the Malabar coast.

Jangár of the Malabar coast, for rivers.

Pambán Manché . . Snake Boat of Cochin.

Bandar Manché . . . Boats used to load ships and carry goods on the coast of Malabar.

Masula Boats Used chiefly at Madras in lading and discharging cargoes, and carrying passengers to and from ships in the Roads.

Mangalore Manché
Calicut Manché
Panyani Manché } These are coast boats, of construction suited to the places from which they are named.

Patamár Vessels employed in the coasting-trade from Bombay to Ceylon.

Arab Dow Vessels employed in the trade between the Red Sea, the Arabian coast, the Gulph of Persia, and the Indian coasts of Cutch, Gujarát, and Malabar. These Dows are also used in the Persian Gulph, for the purposes of war and piracy. They are always manned by Arabs.

Baggalah, or Budgerow } These vessels trade from Cutch, Gujarát, and the Malabar coast, to the Gulph of Persia, the coast of Arabia, and the Red Sea. They are Indian vessels, and manned with Indian seamen, called Lascars.

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Dóni A vessel used in the coasting-trade of Coromandel, from which they often carry cargoes to Ceylon and the Gulph of Manár.

Boatila Manché . . . Used in the Gulph of Manár and the southern parts of the Peninsula, and trading from these to Ceylon.

“The shape and materials employed in the construction of the vessels are minutely stated by Mr. EDYE; and the well-executed plans and sections of each class, by which their descriptions are illustrated, will, I am assured, attract the particular notice of the COUNCIL; to whom I have no hesitation in stating, that I deem Mr. EDYE’S Treatise highly valuable; and am of opinion, that while it merits attention from those engaged in the study of nautical science, it must be acceptable to antiquarians and philosophers, who seek, by comparisons of the works of man in various ages, to draw conclusions as to the progress of human art. And, assuredly, no branch of science merits more of their consideration, than that which enabled him to have intercourse with distant nations, and through such means to advance knowledge and civilization!

“I am, Sir, your obedient, humble servant,

(Signed) “JOHN MALCOLM.”

MR. EDYE’S PAPER.

AMONG all the numerous vessels of every class and description which traverse the ocean, there is a peculiarity of form and construction, intended to meet the various localities of the ports or seas in which they are navigated: and perhaps in no part of the globe is this principle more fully displayed than in the Indian Seas, and on the coasts of the Southern Peninsula of India, including the Island of Ceylon, where the nature and change of the seasons, the monsoons, and the navigation of the seas and rivers, are singularly well provided for, by the truly ingenious and efficient means adopted by the natives in the formation of their rude, but most useful vessels. I shall endeavour to describe these more explicitly, with the aid of Sketches and Designs, the correctness of which I have been most scrupulous to ensure.

CATAMARANS.

The first which I shall describe, will be the *Catamarans* of the Island of Ceylon, which, like those of Madras, and other parts of the coasts of the Peninsula, are formed of three logs of timber, and are used by the natives for similar purposes: the timber preferred for their construction is of the *dúp* wood, or *cherne-maram* (pine-tree). Their length is from twenty to twenty-five feet, and breadth two and a half to three and a half feet, secured together by means of three spreaders and cross-lashings, through small holes; the centre log being much the largest, with a curved surface at the fore-end, which tends and finishes upwards to a point. The side-logs are very similar in form; but smaller, having their sides straight, and fitted to the centre-log, as will be better seen and understood by the accompanying Sketch*.

These well-known floats are generally navigated by two men; but sometimes by one only, with the greatest skill and dexterity; as they think nothing of passing through the surf on the beach at Madras, and at other parts of the coast, while boats of the country could not live on the waves; and at sea, they are propelled through the water to a ship on the coast, when boats of the best construction and form would swamp. In the monsoons, when a sail can be got on them, a small outrigger is placed at the end of two poles, as a balance, with a bamboo mast and yard, and a mat or cotton-cloth sail, all three parts of which are connected; and when the tack and sheet of the sail are let go, it all falls fore and aft, alongside; and being light, it is easily managed. In carrying a press of sail, they are trimmed by the balance-lever, by going out on the poles, so as to keep the log on the surface of the water, and not impede its velocity, which, in a strong wind, is very great. They are frequently met with ten or fifteen miles off the southern part of the Island of Ceylon, and will convey any letter or despatch to the shore with safety: but I cannot say much about its dryness, as the man who takes it has nothing but a pocket made from the leaf of the *areca*-tree (*A. catechu*, Linn.), which is tied round his waist, and is the only article about him. These people may be considered almost amphibious, and are the persons who are employed in the pearl-fishery. They are said to remain under water for fifteen minutes; but this I have never heard from themselves, or could find to be correct, as five minutes is the greatest time that has come to my knowledge†. They certainly think nothing of

* See Plate I.

† In an Account of the Ceylon Pearl Fisheries, by Captain JAMES STUART, inserted in the *Trans. R. A. S.* Vol. III. Part 3. the author states, from personal observation, that the longest time which the divers can remain under water is from eighty-four to eighty-seven seconds.

going down to a depth of forty feet; and will bring up a rupee even, if thrown into the sea at that depth.

THE POINT-DE-GALLE CANOE.

or *Market Boat*, is a boat formed from a single stem of *dúp*-wood, or pine varnish-tree. They are from eighteen to thirty feet in length; from eighteen inches to two and a half feet in breadth; and from two to three feet deep; exclusive of the wash-board, which is about ten inches broad, and sewed to the gunwale by coir-yarns, with loose coir-padding on the joints, in the same manner as the other boats used in India are sewed together, which will be more fully described hereafter. These boats are fitted with a balance-log at the end of the bamboo outrigger, having the mast, yard, and sail, secured together; and, when sailing, are managed in a similar way to the *Catamaran*. Vessels passing the southern part of the Island of Ceylon are generally boarded by these boats, even at the distance of twenty to twenty-five miles from shore. They will sail at the rate of ten miles an hour in strong winds, which are generally prevalent there; and, with a crew of five men, will carry a cargo of fruit, fish, and vegetables, which are the greatest luxuries to passengers, on making the land after a long voyage from England, Bengal, or Bombay. The details of these very interesting vessels will be better understood by reference to the Sketches in Plate II.*

CANOE OF THE MALABAR COAST.

From Cape Comorin to Calicut, on the western side of the Peninsula, the coast abounds with fish, which is generally taken with the hook and line by the natives of the fishing-villages, in a small canoe†, the best description of which is formed from *angeley*-wood‡; but the inferior

* A model of one of these curious boats is in the Museum of the Royal Asiatic Society, to which it was presented by Mrs. Ferring. The Society is also in possession of a model of a boat having *two* outriggers, with balance-logs, used by the natives of some of the islands in the Eastern Archipelago: this model was received from H. J. Domis, Esq., F.M.R.A.S., His Netherlands' Majesty's Resident at Sourabaya, in Java. The natives of New Holland appear to use a similar contrivance, but of a more simple construction, as exhibited in a model in the Society's possession. The Rev. Richard Walter, in his account of Lord Anson's Voyage, gives a minute account, illustrated by an engraving, of what he terms "a flying proa," used at the Ladrone Islands; which is the same, in most essential particulars, as the vessel described above by Mr. Edye. (Vide *Walter's Account of Anson's Voyage round the World*. 4to. London, 1748. p. 339.)—ED.

† See Plate III. No. 1.

‡ *Anjeli*—*Artocarpus hirsuta*. (?)

sort, of *cherne-maram*: they are cut out from the solid tree, and are from eight to twenty feet in length, and from one and a half to two feet in breadth; the depth being about one, or one foot and a half. They are managed with much dexterity by the natives, with a scull-paddle. On the backwater of Cochin, and on the river's mouth, they are employed in great numbers in taking the *saïre* fish or country salmon, &c. The largest sort of boats are used for the conveyance of rice and merchandise on the numerous rivers which disembogue themselves into the back-water, to the extent of 150 miles, parallel to the sea-coast. At times, these boats are converted into the

JANGÁR,

or Double Platform *Canoe**, by placing a floor of boards across two boats, with a bamboo railing which extends from ten to twelve feet fore and aft, and sixteen feet long; and when these boats are thus formed into rafts, cattle and burthensome articles are conveyed across the rivers; as also the native regiments, with all their followers, horses, bullocks, baggage, *bandies* (carts), &c. It appears somewhat probable that the idea of the pontoons now in use at Chatham was taken from these vessels, as those constructed by the engineers there perfectly resemble those used by the natives in India.

PAMBÁN MANCHÉ,

or *Snake-Boat* of Cochin†, is a canoe of great length: they are used by opulent natives and Europeans, as boats for the conveyance and despatch of persons on the numerous rivers and back-water, particularly on that between Cochin, Allipey, and Quilon, which is about eighty miles southward; and on that which runs to Palipact and Trichoir; the former place being about twenty, the latter about sixty miles to the northward. These boats are from thirty to sixty feet in length, without any regard to breadth or depth, as they are worked from the solid tree. The broadest do not exceed three feet. Those of the Rájá and officers of state are very handsomely fitted up, and carved in the most fantastical manner: they are made very neat, and even splendid, with painting, gilding, &c. The largest boats are sculled by about twenty men, double-banked; and when pressed, their velocity is surprising, as much as a mile in five minutes. I have myself been sculled, in one of them, a distance of forty-eight miles in six hours. These boats are peculiarly adapted to the rivers; for it frequently occurs, that in the dry season there

* See Plate III. No. 2.

† See Plate IV.

are sand-banks perfectly dry, nearly a hundred yards in breadth, over which they must be drawn by the strength of the few men who are in them; the smaller size having only six rowers and a coxswain. Those natives who can afford the expense, have the cabin neatly fitted up, with venetian-blinds on the sides; but generally the *cuscus*, or grass-mat, is substituted. This boat is formed from the *angeley*-wood, which is very durable, if kept oiled.

COCHIN BANDAR-MANCHÉ,

or *Canoe of Burthen**.—These canoes are cut and formed from the largest and softest timber of the forest. They are from twenty to fifty feet in length; their breadth and depth being proportioned to the full size of the tree, so as to reduce its dimensions as little as possible. They will carry about eighteen tons' burthen, and are made from three to five inches thick at the bottom; but at the top of the side, or gunwale, about one and a half to two inches, with a proportionate increase of thickness at the extreme ends, to protect the end-grain of the wood, and withstand any shock that they may meet with. At the distance of about five feet on the inside there are ribs about six inches broad, projecting about two inches from the side of the boat, for the purpose of giving support and strength to the body of the canoe. These boats may be considered valuable for the service of the port at which they are used; and notwithstanding their heavy appearance, they are very buoyant, and go very fast through the water. In one of about thirty-five feet long, with six men and a *tindal* (coxswain), I passed the *Minden's* (the admiral's ship) barge, which had twelve men on board; and in a distance of four miles to that ship's anchorage, I gained on them by time about twenty minutes, although there was a strong sea-breeze and swell against us.

At Cochin, these boats are used for the purpose of conveying various articles of burthen and water to the ships in the roads. This is well known to the homeward-bound ships from Bombay, and those bound from the Red Sea and Arabia to Calcutta; as they generally call off this port, for supplies of every sort. Two of the larger size were sent, by order of Commissioner UPTON, to Trincomalí, for the use of the dock-yard; and after being constantly used during four years, for the purpose of carrying stones, bricks, sand, coral, &c., across the bay, they were left, when the establishment was broken up, in a sound and complete state; which circumstance may be attributed to their having had copper sheets

* See Plate V.

put on their bottoms, to protect them from the worms. The expense of each canoe was about eighteen pounds sterling; and they would convey from twelve to twenty tons, each boat.

It would be worthy of consideration, and a great service to the navy, to have one of these boats, with a native crew, attached to each ship; for the purpose of saving the seamen, and ship's-boats, from exposure to the intense heat of the sun, the bad effects of which are so very sensibly felt by Europeans at all times.

THE MADRAS MASÚLA MANCHE

Is formed with a flat bottom, for the purpose of taking the beach in the surf, when European boats cannot approach it. These boats are beached in the third surf; and taken most completely out of the water, on the immediate receding of the swell, by natives who are at all times stationed there by the Government, and belong to the Master-Attendant's department.

The planks which form these boats are sewed together with coir-yarns, crossing the seams over a wadding of coir, which presses on the joints, and prevents leakage. By this peculiar means of security, the vessel is rendered pliable, and yields to the shock which she receives on taking the ground; whilst boats with framed timbers and planks, nailed or trenail-fastened, would be broken to pieces, from the heavy surf, that at times runs as high as from six to ten feet. The *Catamaran* is kept in attendance, as a life-preserver, in the event of any accident to the *masula*-boat, by upsetting; or in case of any of the Europeans being washed out by the surf.

The *masula*-boats receive their cargoes and passengers from the ships outside the surf; and land them in perfect safety, provided the crew be treated with civility: if otherwise, they will not fail to moisten the offender, to such a degree as to shew the passengers that they are in their power, and make them objects of derision to the men on the beach. These boats are rowed by twelve men, in double banks, with bamboo paddles; that is, a board about ten inches broad and fourteen inches long, fixed at the end of a bamboo. They are steered by two *tindals* (coxswains); and two men are constantly kept to bale out the water; from which employment they are promoted to the paddle, or bow-oar; when they fall aft, in rotation, to be a *tindal* or steersman*. The

* The steersman gives time by a song, which is sung by all the boatmen; and according as its modulations are slow or quick, the oars are plied. These modulations are regulated by the waves, as they may be slow or rapid, in succession.

dimensions of the *masula*-boat are from thirty to thirty-five feet in length, ten to eleven feet in breadth, and seven to eight feet in depth: the details of their form will be understood from the drawing*.

MANGALORE MANCHÉ†

Is a flat-bottomed boat of burthen, about twenty-five to thirty-five feet long, six to seven feet broad, and four to five feet deep. It is formed to meet the river, which is very shallow and flat; and to land the cargoes of the *patamárs*, which are discharged and loaded at the mouth of the rivers. These boats are sewed together similar to the *masula*-boat and other native vessels: they are forced along by bamboo poles; as the water is not more than from six to ten feet deep, except in the south-west monsoon, when the rapids swell, and the whole of the river is considered impassable; and at this period all the vessels are taken to the shore and laid up.

CALICUT MANCHÉ‡

Is a boat very similar to that of Mangalore, with the exception only of a raking stern, for the purpose of taking the beach; as the port of Calicut is open to the coast, and there is no river. These boats are propelled by the paddle and sail, and generally carry eight men: they are much employed in watering and completing the sea-stock of ships homeward-bound; also in loading ships with pepper, timber, &c., for Bombay; and in shipping the produce of the forests of Canara and Malabar, for the naval yard of the East-India Company; all of which is rafted off to vessels called *dows*, *boatilas*, *patamárs*, &c., hereafter described.

PANYANI MANCHÉ§

Is a coasting boat, of about fifty feet long, ten to twelve feet broad, and five to seven feet deep. It is framed with timbers and planks; which are sewed together, as before described. The timbers are about four feet asunder; and on them, inside, some few planks are placed as bands and

cession. I remember, on one occasion, when a passenger of rank shewed impatience at this noisy song, the boatmen were desired to cease; but the steersman refused compliance with the order, saying, that without his song he would not be answerable for the safety of the passenger.—(Note by Sir J. MALCOLM.)

* See Plate VI.

† See Plate VII.

‡ See Plate VIII.

§ See Plate IX.

clamps, which are nailed to the frame. These vessels are very rudely put together; and not of much importance, either in form or construction. During the south-west monsoon, or from June to November, they are laid up at *Baipúr* river for safety, and are only used in the fine-weather season. They carry the productions of the coco-nut tree, viz. *coir**, *copera*†, *cajan*‡, *jageri*§, oil, and *arrac*||, to Cochin and Mangalore; and, from these parts, rice, cloth, salt, &c. These vessels keep along shore, and take advantage of the sail in rowing. They have generally from eight to ten men, who are fishermen, and of the *Mopila* caste¶.

THE PATAMÁRS**

Are a class of vessels which may be considered the best in India; as they sail remarkably well, and stow a good cargo. They belong principally to Bombay merchants, and carry on the whole of the coasting-trade to that port. They are grab-built; that is, with a prow stern, which is the same length as the keel; and the dimensions of the large class are seventy-six feet six inches in length, twenty-one feet six inches in breadth, eleven feet nine inches in depth, and about two hundred tons' burthen. They are planked with teak, upon jungle-wood frames; and are really very handsome vessels, being put together in the European manner, with nails, bolts, &c.: and their bottoms are sheathed with inch-board, and a layer of chunam mixed with coco-nut oil and a portion of *damar* (country rosin): this is a very durable substance, and a great preservative to the plank against worms.

Some of the smaller class of these vessels, of about sixty tons' burthen, are sewed together with *coir*, as other native boats are. The small class has one, and the large class two masts, with the latteen-sail; the fore-mast raking forward, for the purpose of keeping the ponderous yard clear, when it is raised or lowered. The yard is slung at one-third of its length; the tack of the sail is brought to the stern-head, through a

* *Coir* is the husk of the coco-nut (*Cocus nucifera*), from which rope is made.

† *Copera* is the inside or fruit of the nut, from which oil is expressed.

‡ *Cajan* is the leaf of the tree (*Corypha umbraculifera*), which is used for covering of houses; also for books, and various other purposes.

§ *Jageri* is a kind of sugar, which is made from the toddy or juice of the Palm.

|| *Arrac* is a strong spirit, distilled from the toddy taken from the top of the Palm.

¶ A race of Musalmáns, descendants of the first Arabian settlers on the shores of the peninsula; and who marrying the daughters of the country, obtained the name of *Mápillai*, or "sons-in-law," corrupted by Europeans into the above term.—ED.

** See Plate X.

fixed block; and the sheet hauled aft at the side, as usual. The haulyard is a pendent and treble block, from the mast-head aft to midships; thus acting as a back-stay for the mast's security, together with about two pairs of shrouds. These vessels generally export salt from Bombay to the coast, and take back *coir*, rice, coco-nuts, *copera*, oil, timber, sandal-wood, pepper, and various articles, the production of the coast. They are navigated with much skill, by men of the *Mopila* caste and other Musalmáns; and have a crew of ten or twelve men, and a *tindal*, who are good pilots and navigators of the coast from Bombay to Cape Comorin; generally speaking, honest and trustworthy; and very respectful to Europeans.

THE ARAB DOW *

Is a vessel of about one hundred and fifty to two hundred and fifty tons' burthen, by measurement; grab-built, with ten or twelve ports; about eighty-five feet long, from stem to stern; twenty feet nine inches broad; and eleven feet six inches deep. Of late years, this description of vessel has been built at Cochin, on the coast of Malabar, most perfectly, in the European style. These vessels have a great rise of floor; are calculated for sailing with small cargoes; and are fully prepared, by internal equipment, for defence, with decks, hatchways, ports, poop-deck, &c., as shewn by the sketch, which, it will be seen, is that of a vessel of war: many of them are sheathed, on two-and-a-half-inch plank bottoms, with one-inch board, and the preparation of *chunam* and oil, as before described, which is called *galgal*, put between the planks and sheathing-board, causing the vessel to be very dry and durable, and preventing the worm from attacking the bottom.

The worm is one of the greatest enemies in India to timber in the water, while the white-ant is as much so out of it. On the outside of the sheathing-board there is a coat of white-wash, made from the same articles as that between the sheathing and planks; which coat is renewed every season they put to sea. These vessels have generally one mast, and a latteen-sail: the yard is the length of the vessel aloft; and the mast raking forward, for the purpose of keeping this ponderous weight clear, in raising and lowering. The tack of the sail is brought to the stern-head, and sheets aft in the usual way; the haulyards lead to the taffrail, having a pendent and treble purchase-block, which becomes the back-stay, to support the mast when the sail is set: this, with three pairs of shrouds, completes the rigging; which is very simple, the whole being of *coir-rope*.

Several of these vessels have been fitted as brigs, after their arrival

* See Plate XI.

in Arabia; and armed by the Arabs for cruising in the Red Sea and Arabian Gulf, as piratical vessels: they are also the class of vessels of which TIPPÚ SULTÁN'S navy at *Onore* consisted. When armed, they are too powerful for the Bombay marine-brigs*. The large *dows* make generally one voyage in the season, to the southward of Arabia; taking advantage of the north-east monsoon to come down, and the south-west to return with an exchange cargo. They generally bring dates, fruit, preserves, *Shiráz*-wine, and horses; and take back rice, *coir*, canvas, coconuts, oil, timber, *damar*, &c., the various articles of cloth of the country manufacture, and, from Bombay, European articles of every description. The trade of this part of the country is very great in those vessels; extending from *Allipecy*, the southernmost port on the coast of Malabar, up to Bombay: but all the trade to Bengal is carried on by ships which are called "Country Traders," from the Gulf of Persia and Arabia. The Arabs are a powerful, well-grown, handsome people, and very acute and intelligent in trade. They usually navigate their ships to Bengal in perfect safety, and with great skill: this was well known to Captain COLLIER and his officers, of the *Liverpool* frigate, when they had the trial cruise with the IMÁM of MASCAT'S fine frigate, in 1820.

THE BAGGALA, OR BUDGEROW,

Navigates the Indian seas from the Gulf of Cutch, and is one of the most ancient vessels there to be met with. Their extreme length, from stern to taffrail, is about seventy-four feet, the breadth about twenty-five feet, and the depth in hold eleven feet six inches, with about one hundred and fifty tons' burthen. The peculiarity of form and extraordinary equipment of these vessels is said to have been the same from the period of ALEXANDER the GREAT: they are armed with two guns on the after-part or right-aft of the stern, for defence against pirates; and have their poop-decks with a round stern: their extreme section is abaft the centre or middle of the vessel: they are very broad in proportion to their length, with a sharp rising floor: the stern is straight, and rakes very little more than the stern-post. The form of the vessel, however, will be better understood by a reference to the drawing†.

These vessels are constructed with timbers and planks, which are nail and trenail fastened, in the most rude and unsafe manner possible. The topside above the deck is barricadoed with mats on the outside of

* This has never happened, but when in great numbers, and the brigs weak and unsupported.—(*Note by Sir J. MALCOLM.*)

† See Plate XII.

the timbers, which run up to about eight feet from the deck ; and when they have no cargo on board, this barricado is removed.

They have only one mast ; with a huge yard made from two spars, the small ends lashed together ; and a latteen sail, the tack of which goes to the stern-head, as in the other vessels before described : they generally trade like the *Dows* ; and are navigated by Arabs and the people of Cutch.

This singular and rude vessel, as well as the Arab *Dow*, is peculiarly adapted to the coasts of Arabia and the Red Sea, which are subject to periodical winds, during which these vessels are navigated with much ease.

THE DÓNÍ *

of the Coromandel coast is a huge vessel of the ark-like form, about seventy feet long, twenty feet broad, and twelve feet deep ; with a flat-bottom or keel-part, which at the broadest place is seven feet ; and at the fore- and after-parts of the vessel it breaks into ten inches, which is the siding of the stem and stern-post. The fore- and after-bodies are similar in form, from midships. Their light draught of water is about four feet ; and when loaded, about nine feet. These rude unshapely vessels trade from Madras and the coast to the Island of Ceylon ; and many of them to the Gulf of Manár, as the water is shoal between Ceylon and the southern part of the Continent. They have only one mast, with a lug-sail ; and are navigated from land to land, and coastwise, in the fine season only.

It may not be uninteresting to know the means used, by the people who navigate these vessels, to find the rate of current in the Bay of Bengal, which is very great at the change of the season or monsoon, as much as sixty miles in twenty-four hours. When they are off a port, in a calm, they throw a handful of sand or shells, and feathers, into the calm sea ; and by the drifting of the feathers on the surface, and sinking of the sand or shells, a calculation of the rate of current is formed, and they anchor off the coast accordingly.

The anchor is made, in the most simple way imaginable, by lashing together three crooked branches of a tree, which are then loaded with heavy stones ; and their cable is formed from coir-yarns. In fact, the whole equipment of these rude vessels, as well as their construction, is the most coarse and un-seaworthy that I have ever seen, and far behind those of any other part of India.

* See Plate XIII.

THE BOATILA MANCHÉ*

of the Island of Ceylon, which navigates the Gulf of Manár, and the southern part of the Peninsula of India. This boat, which is about fifty to sixty feet in length, sixteen to eighteen feet in breadth, and eight to ten feet in depth, has more of the European form than any of the Indian-built vessels that are met with. The after-part shews the origin to be of Portuguese construction, as it is very similar to that of many of the boats still in use by the people of that country; which are said to be of the same shape as the vessel in which VASCO DE GAMA sailed to India.

They have a deck fore and aft; and are built with all sorts of jungle-wood, in a very rough manner, and fastened with nails and bolts. They are equipped with one mast, which inclines forward, and a square lug-sail; also a small bowsprit, at about the angle of 45°, with a sort of jib fore-sail, one pair of shrouds, and a back-stay, which completes the rigging. These vessels carry on the trade of the island across the Gulf. The exports are, rice, tobacco, &c.; and the imports, cloth. This forms a great part of the revenue of the island, in the district of Jaffnapatam,

* See Plate XIV.

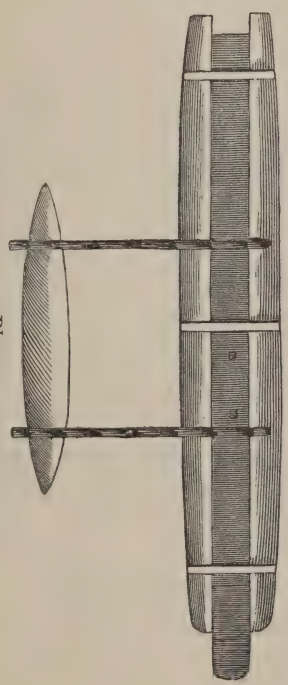
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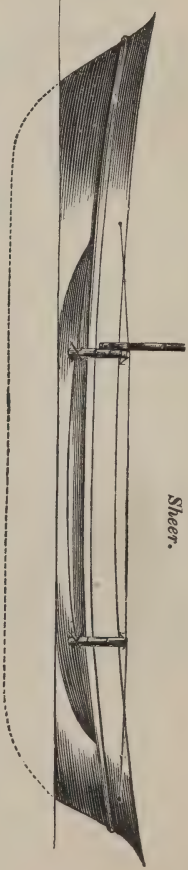


Plan.

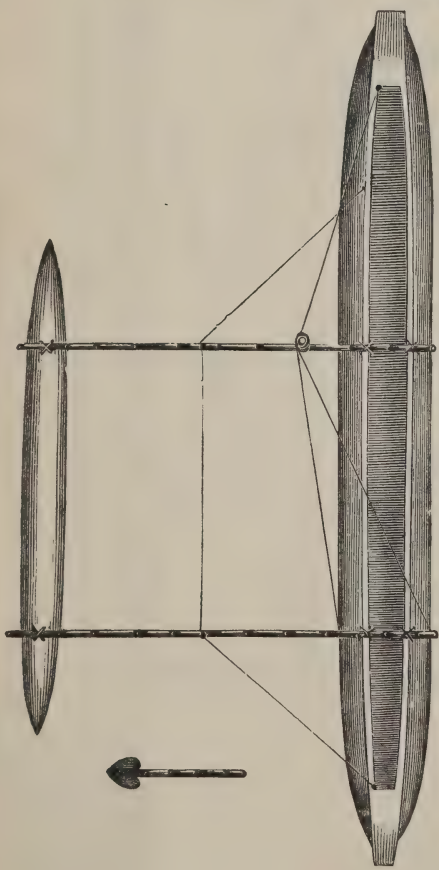


CATAMARAN.

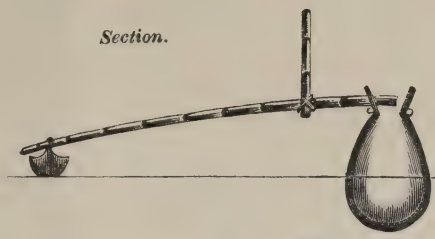
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Plan.

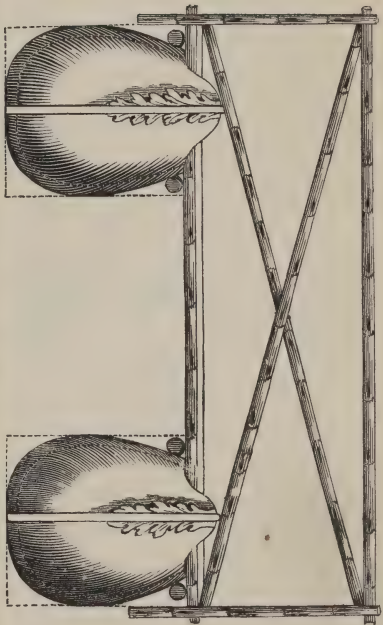


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POINT-DE-GALLE CANOE.

N^o. 2.

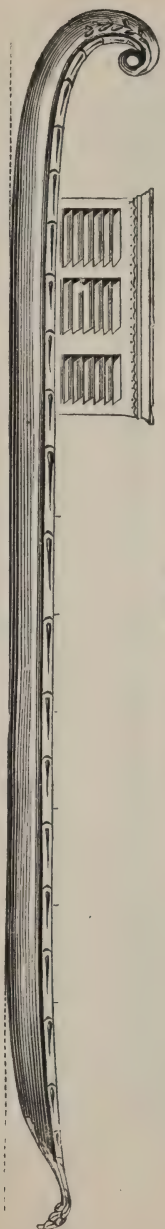


N^o. 1.



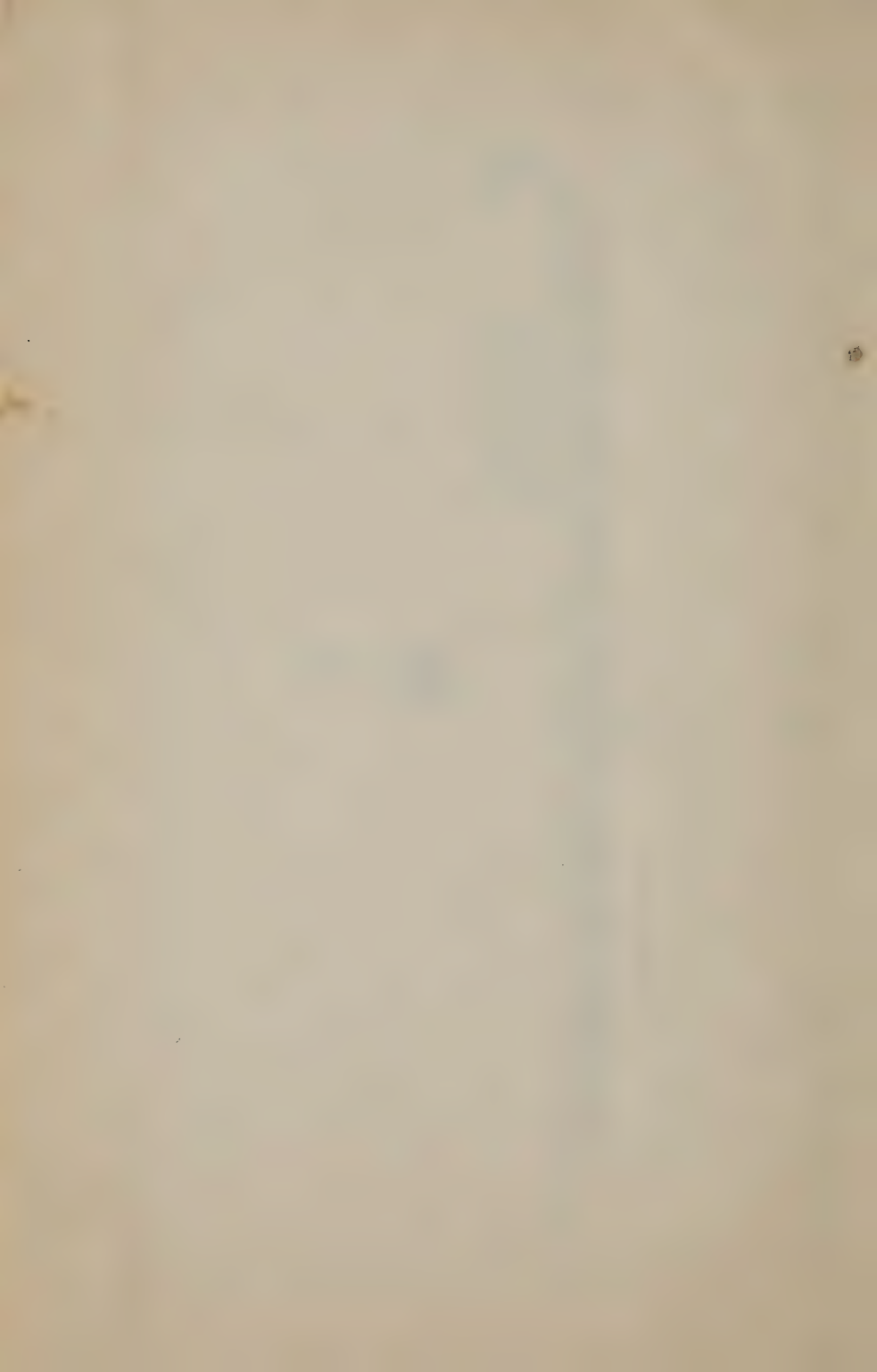
N^o 1. CANOE OF THE MALABAR COAST; & N^o 2. THE JANGÁR.

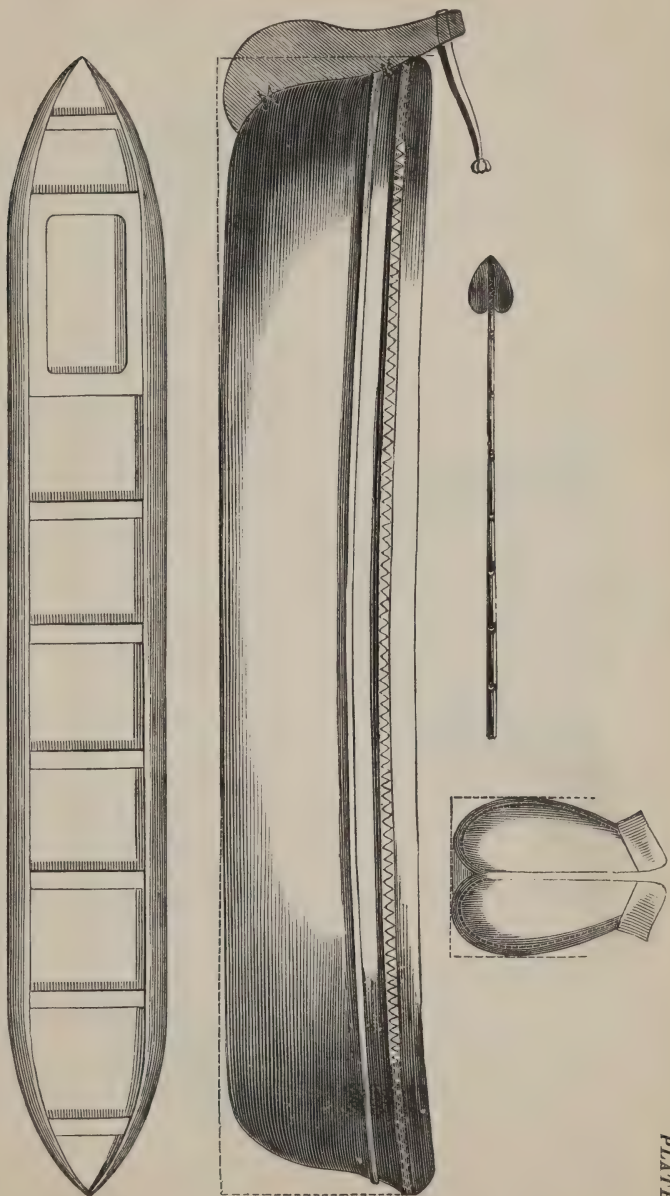
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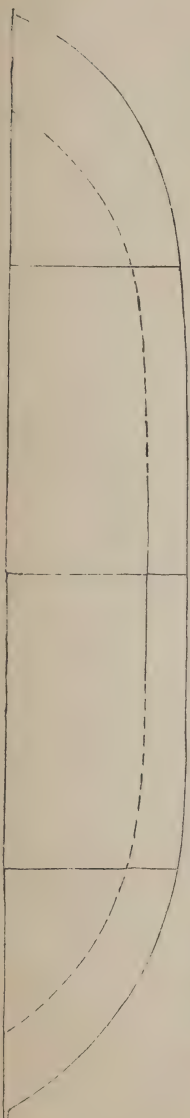
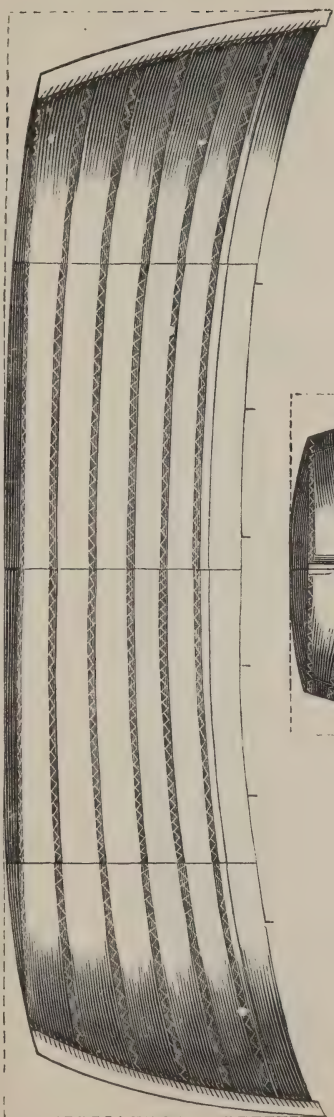
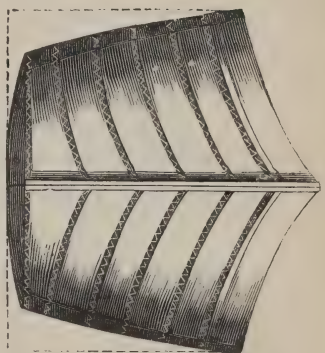
Sculls.

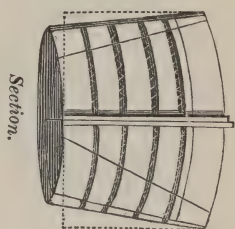
PAMBÁN MANCHE.



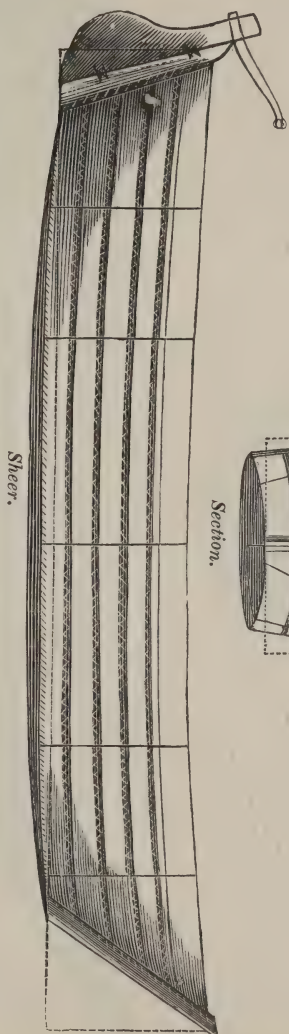


COCHIN-BANDAR MANCHE.

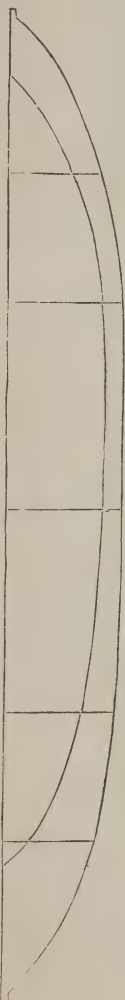




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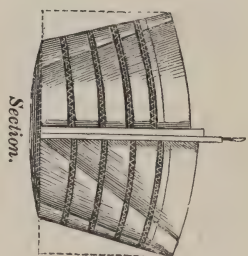


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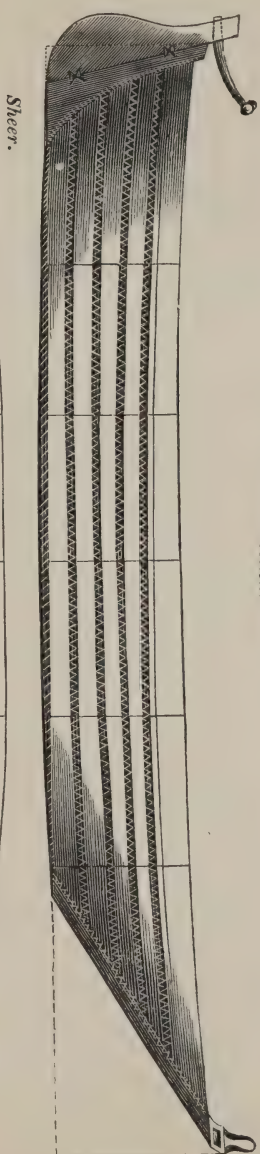


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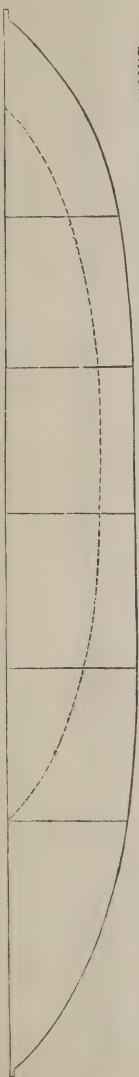
MANGALORE MANCHE.



Section.



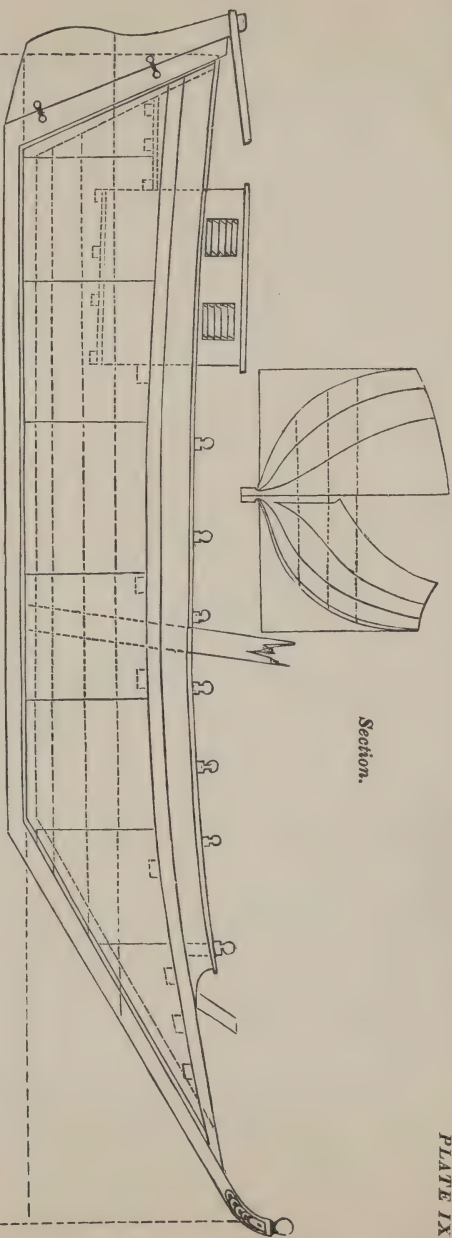
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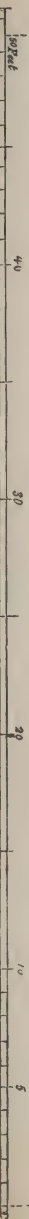
Plan.

CALICUT MANCHE.

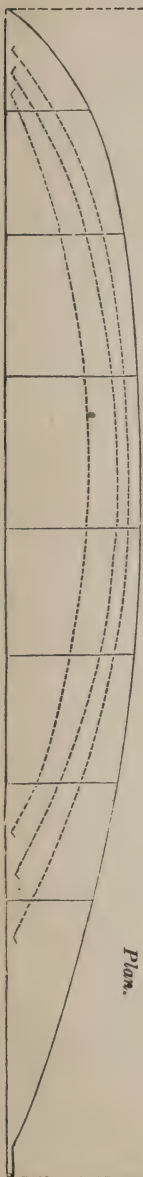
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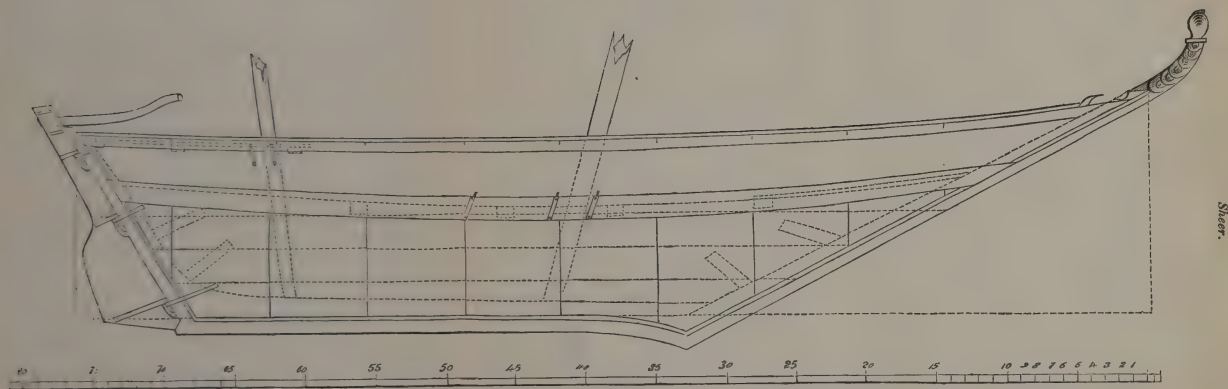
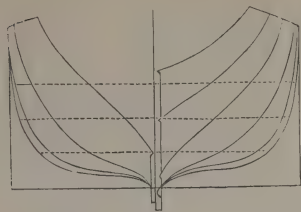


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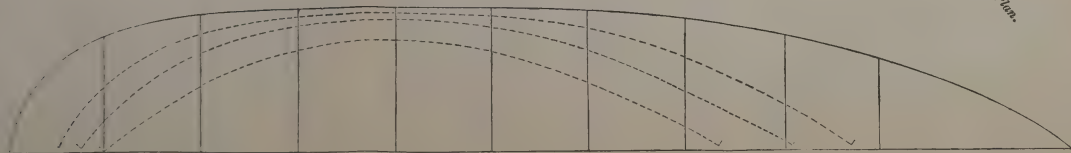




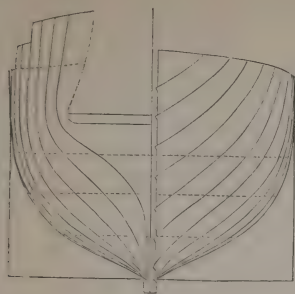
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Plan.

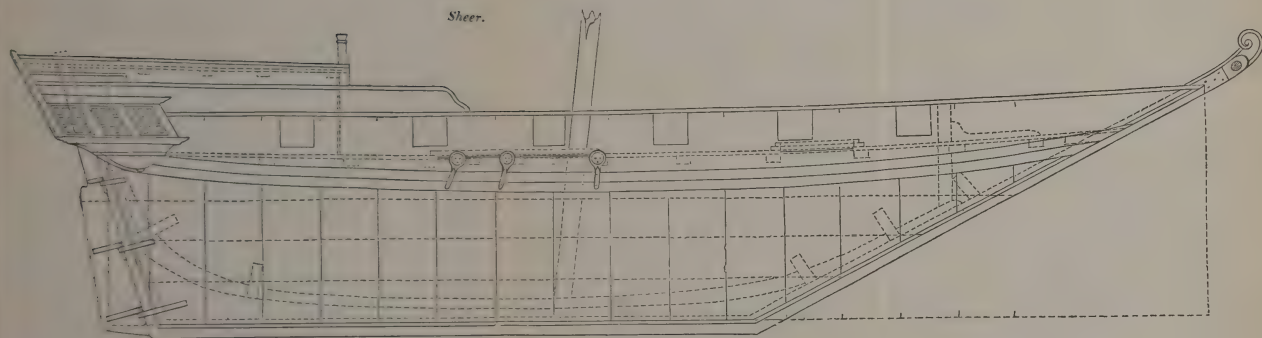




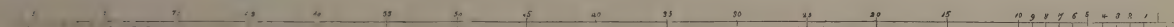
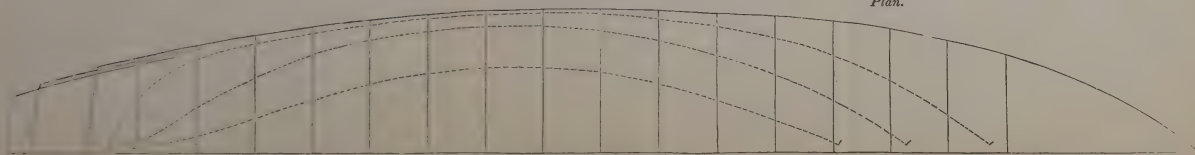


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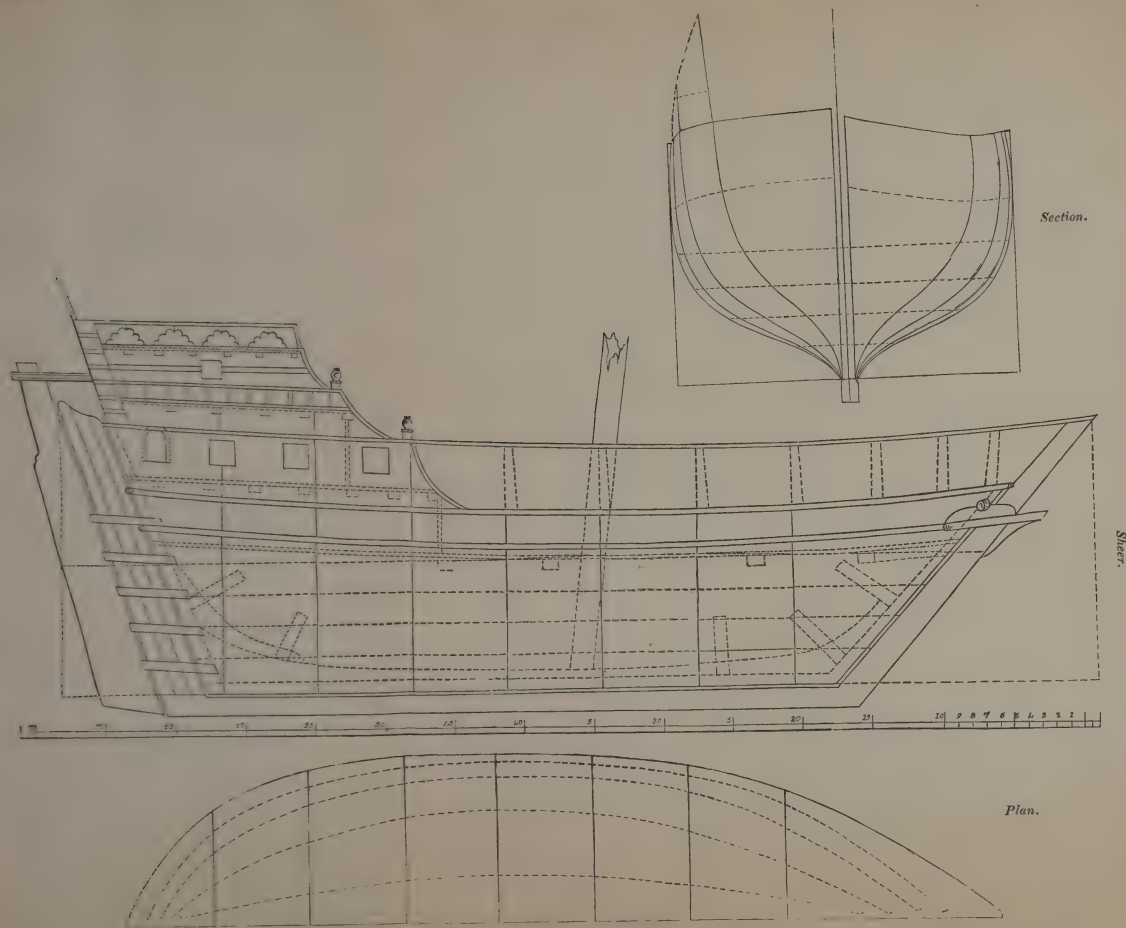
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Plan.



ARAB DOW.

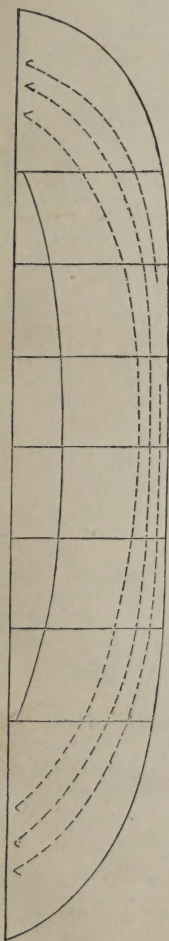
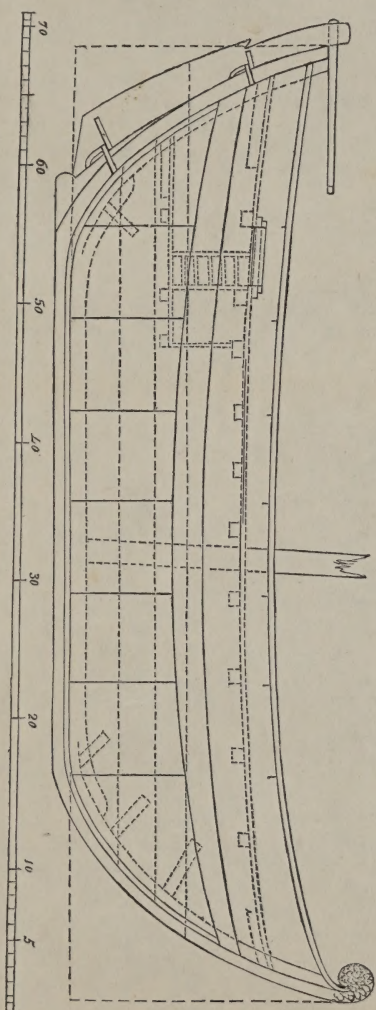
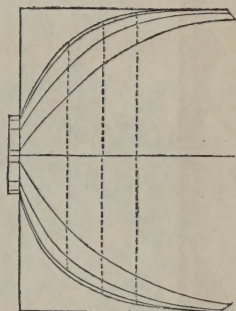


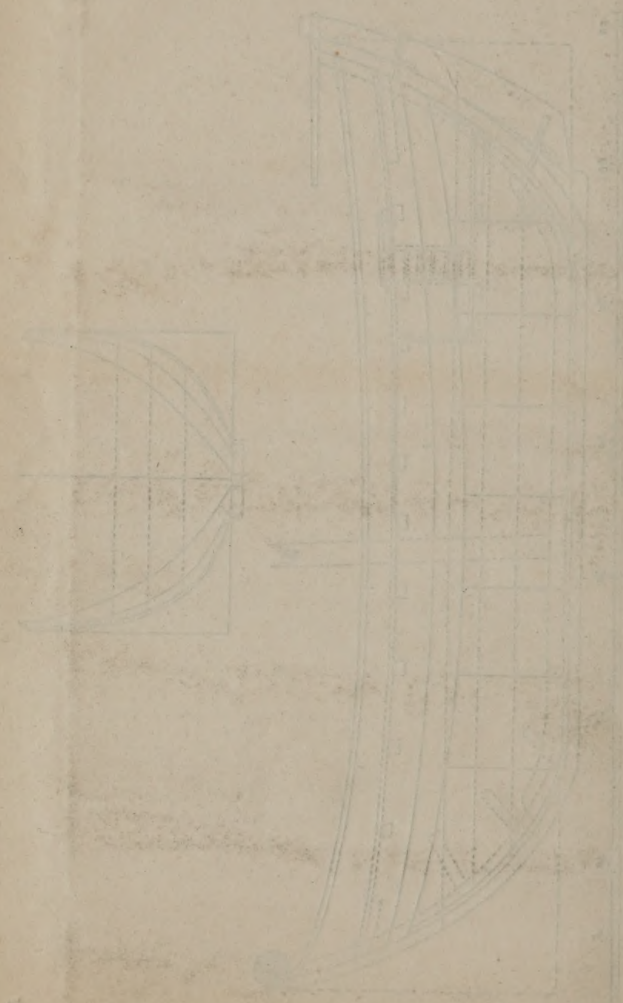
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Stern.

Plan.

BAGGALA, OR BUDGEROW.





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